Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-14 (Cancelled).

15(Currently amended). A method for increasing the population of hematopoietic $CXCR4^+$ stem cells for use in clinical transplantation, which comprises up-regulating surface CXCR4 expression of hematopoietic stem cells and sorting out those $CXCR4^+$ stem cells that migrate in response to stromal-derived factor (SDF-1).

16(Previously presented). The method according to claim 15, wherein said up-regulation is carried out by stimulation of a cellular population comprising hematopoietic $CXCR4^+$ and $CXCR4^{-/low}$ stem cells that have the potential to express CXCR4 on the cell surface, with a suitable agent, thus converting the $CXCR4^{-/low}$ into $CXCR4^+$ cells, and sorting out those $CXCR4^+$ stem cells that migrate in response to SDF-1.

17(Currently amended). A method for the preparation of a cell composition ~~according to claim 1~~ consisting essentially of human hematopoietic $CD38^{-/low}$ $CXCR4^+$ stem cells capable of migrating in response to stromal-derived factor 1 (SDF-1), said

hematopoietic $CD38^{-/low}$ $CXCR4^{+}$ stem cells being selected from the group consisting of stem cells that express CXCR4 on the cell surface, $CXCR4^{-/low}$ stem cells that have the potential to express CXCR4 on the cell surface and are converted to $CXCR4^{+}$ cells upon stimulation with a suitable agent, and combinations thereof, and wherein said hematopoietic $CD38^{-/low}$ $CXCR4^{+}$ stem cells have the capacity of migrating to, and of engraftment and repopulation of, the bone marrow in a host, said method comprising stimulating with a suitable agent a cell composition comprising hematopoietic $CD38^{-/low}$ $CXCR4^{+}$ and $CD38^{-/low}$ $CXCR4^{-/low}$ stem cells that have the potential to express CXCR4 on the cell surface, thus converting the $CD38^{-/low}$ $CXCR4^{-/low}$ into $CD38^{-/low}$ $CXCR4^{+}$ stem cells, and sorting out those $CD38^{-/low}$ $CXCR4^{+}$ stem cells that migrate in response to SDF-1.

18(Currently amended). The method according to claim 17, wherein said suitable agent capable of converting $CD38^{-/low}$ $CXCR4^{-/low}$ stem cells into $CD38^{-/low}$ $CXCR4^{+}$ stem cells is a member selected from the group consisting of a lectin, a cytokine, at least one type of mammalian stromal cells, and mixtures thereof, said cytokines and stromal cells being cytokines and stromal cells involved in a process of maintenance, expansion, development, or combinations thereof, of stem cells.

19(Previously presented). The method according to claim 18, wherein said cytokine is a member selected from the group consisting of SCF, IL-1, IL-6, IL-11, GM-CSF, and mixtures thereof.

20(Previously presented). The method according to claim 19, wherein said cytokine is a member selected from the group consisting of SCF, a mixture of SCF and IL-6, and a mixture of SCF and GM-CSF.

21(Currently amended). The method according to claim 18, wherein the $CD38^{-/low}$ $CXCR4^{-/low}$ cells that have the potential to express CXCR4 on the cell surface are stimulated with at least one type of mammalian stromal cells involved in maintenance, expansion and/or development of stem cells.

Claim 22 (Cancelled).

23(Currently amended). The method according to claim 18, wherein the $CD38^{-/low}$ $CXCR4^{-/low}$ cells that have the potential to express CXCR4 on the cell surface are stimulated with at least one type of mammalian stromal cells and a cytokine or a mixture of cytokines.

24(Previously presented). The method according to claim 23, wherein stimulation is carried out with at least one type of stromal cells and a cytokine selected from the group

consisting of SDF-1, SCF, IL-1, IL-6, IL-11, GM-CSF, a mixture of SCF and IL-6, and a mixture of SCF and GM-CSF.

25(Previously presented). A method for increasing the population of hematopoietic stem cells for use in clinical transplantation, which comprises inducing a cellular population of $CXCR4^+$ stem cells to adhere to stromal cells in response to an adhesion-inducing agent and sorting out those $CXCR4^+$ stem cells that adhered to the stromal cells in response to said agent.

26(Previously presented). The method according to claim 25, wherein said adhesion-inducing agent is selected from the group consisting of a cytokine, a lectin and a phorbol ester.

27(Original). The method according to claim 26, wherein said adhesion-inducing agent is SDF-1.

Claims 28-32 (Cancelled).

33(Original). An in vitro method for screening human immature hematopoietic $CXCR4^+$ cells derived from bone marrow, cord blood, fetal liver, yolk sac or mobilized peripheral blood cells as candidates for transplantation into human hosts, said method comprising:

(a) measuring the level of cell surface CXCR4 expression in a separate sampling of cells with labeled anti-CXCR4 monoclonal antibodies;

(b) increasing, if necessary, the level of $CXCR4^+$ cells in the original sample by stimulation of $CXCR4^{-/low}$ cells with a suitable agent;

(c) measuring the $CXCR4^+$ cells' ability to migrate in response to SDF-1 and/or to adhere to stromal cells in response to an adhesion-inducing agent; and

(d) sorting out the $CXCR4^+$ cells with a high migratory capability in response to SDF-1 and/or the cells which adhered to the stromal cells, these being the cells suitable for successful transplantation into human hosts.

Claims 34-47 (Cancelled).

48(Currently amended). A method for preparation of a cell composition consisting essentially of a cellular population of hematopoietic $CXCR4^+$ pluripotent stem cells capable ~~to migrate~~ of migrating in response to SDF-1, for autologous transplantation to a cancer patient, by *ex vivo* purging of malignant cells from a cancer patient while maintaining and enriching for normal hematopoietic $CXCR4^+$ stem cells, said method comprising:

(i) providing hematopoietic stem cells from a cancer patient, the malignant cells of which patient do not migrate to a chemotactic gradient of SDF-1;

(ii) stimulating said hematopoietic stem cells with a suitable agent to enhance their CXCR4 surface expression and response to SDF-1;

(iii) carrying out an in vitro transmigration assay with the stimulated cells of (ii) to a gradient of SDF-1 across a mechanical barrier of cells in order to prevent spontaneous non-specific migration of malignant cells;

(iv) washing the migrating cells to remove SDF-1; and

(v) isolating the cells obtained in (iv),

said isolated cells being hematopoietic $CXCR4^{+}$ stem cells responsive to migration to SDF-1 and purged from the patient's malignant cells and suitable for autologous transplantation to the cancer patient.

49(Original). The method according to claim 48, wherein the hematopoietic cells are derived from the patient's bone marrow or mobilized peripheral blood cells.

Claims 50-116 (Cancelled).

117(New). The method according to claim 16, wherein said suitable agent capable of converting $CXCR4^{-/low}$ stem cells into $CXCR4^{+}$ stem cells is a member selected from the group consisting of a lectin, a cytokine, at least one type of mammalian stromal cells, and mixtures thereof, said cytokines and stromal cells being cytokines and stromal cells involved in a

process of maintenance, expansion, development, or combinations thereof, of stem cells.

118(New). The method according to claim 117, wherein said cytokine is a member selected from the group consisting of SCF, IL-1, IL-6, IL-11, GM-CSF, and mixtures thereof.

119(New). The method according to claim 118, wherein said cytokine is a member selected from the group consisting of SCF, a mixture of SCF and IL-6, and a mixture of SCF and GM-CSF.

120(New). The method according to claim 117, wherein the $CXCR4^{-/low}$ cells that have the potential to express CXCR4 on the cell surface are stimulated with at least one type of mammalian stromal cells involved in maintenance, expansion and/or development of stem cells.

121(New). The method according to claim 117, wherein the $CXCR4^{-/low}$ cells that have the potential to express CXCR4 on the cell surface are stimulated with at least one type of mammalian stromal cells and a cytokine or a mixture of cytokines.

122(New). The method according to claim 121, wherein stimulation is carried out with at least one type of stromal cells and a cytokine selected from the group consisting of SDF-1, SCF, IL-1, IL-6, IL-11, GM-CSF, a mixture of SCF and IL-6, and a mixture of SCF and GM-CSF.

123(New). The method according to claim 18, wherein the $CD38^{-/low}$ $CXCR4^{-/low}$ stem cells are stimulated for up to five days with a suitable agent capable of converting $CD38^{-/low}$ $CXCR4^{-/low}$ stem cells into $CD38^{-/low}$ $CXCR4^{+}$ stem cells and wherein said suitable agent is selected from the group consisting of a cytokine, at least one type of mammalian stromal cells, and mixtures thereof.

124(New). The method according to claim 123, wherein the $CD38^{-/low}$ $CXCR4^{-/low}$ stem cells are stimulated with said suitable agent for 1-2 days.

125(New). The method according to claim 117, wherein the $CXCR4^{-/low}$ stem cells are stimulated for up to five days with a suitable agent capable of converting $CXCR4^{-/low}$ stem cells into $CXCR4^{+}$ stem cells and wherein said suitable agent is selected from the group consisting of a cytokine, at least one type of mammalian stromal cells, and mixtures thereof.

126(New). The method according to claim 125, wherein the $CXCR4^{-/low}$ stem cells are stimulated with said suitable agent for 1-2 days.

127(New). A method of increasing the population of $CXCR4^+$ stem cells that migrate in response to stromal-derived factor (SDF-1), comprising:

treating $CD34^+$ stem cells with a suitable agent selected from the group consisting of a lectin, a cytokine, at least one type of mammalian stromal cell, and a mixture thereof, said cytokine and stromal cell being involved in a process of maintenance, expansion and/or development of stem cells; and

sorting out those $CXCR4^+$ stem cells that migrate in response to SDF-1.

128(New). A method in accordance with claim 127, wherein said suitable agent is selected from the group consisting of SDF-1, SCF, IL-1, IL-6, IL-11, GM-CSF and mixtures thereof.